

## CLAIMS

WHAT IS CLAIMED IS:

1. A spa control system comprising a control panel, output components, and a heating element which heats the water in the spa, and further comprising:
  - a solid state sensor for detecting the temperature of water in the spa;
  - a solid state sensor for detecting the temperature of the heating element; and
  - a microcomputer for processing the signals from said sensors to calculate the temperature of the water and the heating element so that the heating element controls the temperature of the water within a prescribed range.
2. A system as described in Claim 1, further comprising a ~~Traic~~ <sup>TRIAC</sup> which drives at least one output component of the spa control system.
3. A system as described in Claim 1, further comprising an Opto-Isolator connected between the control panel and the ~~Traics~~ <sup>Triacs</sup> for electrically isolating the control system from the main power supply.
4. A spa control system for detecting the malfunction of components within the system, comprising:
  - a display;
  - a pump;
  - a heating element;
  - a system interconnection panel which is connected to said pump and said heater; and
  - a microcomputer ~~within said system interconnection panel~~ for detecting the malfunction of said pump or said heating element and for generating a signal which illuminates said display to ~~show~~ <sup>show</sup> the

malfunction of the component.

5. A spa control system for controlling the temperature of water in the spa, comprising:
  - a heating element for heating the water;
  - a solid state sensor for detecting the temperature of the water;
  - a solid state sensor for detecting the temperature of said heating element;
  - a microcomputer for processing signals generated by said sensors to compute the temperature of the water and of said heating element, wherein said microcomputer activates and deactivates said heating element to control the temperature of said water within a selected range.
6. A spa control system as described in Claim 5, wherein said microcomputer activates said heating element to heat the water to a selected temperature without heating the water above the selected temperature.
7. A spa control system as described in Claim 5, wherein said microcomputer calculates the rate of heating of the water and said heating element, and activates and deactivates said heating element to heat the water to a selected temperature.
8. A spa control system for controlling the temperature of water in a spa, comprising:
  - a system interconnection panel containing a microcomputer and being connected to a power supply;
  - a control panel connected to said system interconnection panel;
  - a heating element connected to said system interconnection panel; and
  - a pump for circulating water over said heating element.

9. A spa control system as described in Claim 8, further comprising a heat sink adjacent said water for transferring heat from said system interconnection panel to said water.
10. A spa control system as described in Claim 8, further comprising a display in said control panel for <sup>showing</sup>~~showing~~ certain characters calculated by said microcomputer.
11. A spa control system as described in Claim 10, wherein said display <sup>shows</sup>~~shows~~ a character sent by said microcomputer which identifies a malfunction of said spa control system.
12. A spa control system as described in Claim 10, wherein said display indicates the operation time of selected components of the spa control system.

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